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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,883	10/25/2003	Jason M. Chilcote	H0004596	1908

7590 06/21/2005

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EXAMINER	
WHITTINGTON, KENNETH	
ART UNIT	**PAPER NUMBER**
2862	

DATE MAILED: 06/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/692,883	CHILCOTE ET AL.	
	Examiner	Art Unit	
	Kenneth J. Whittington	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Bot Ledynh
Primary Examiner

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

The Amendment filed May 18, 2005 has been entered and considered. In view thereof, the objections to the claims and abstract as outlined in the Office Action mailed February 18, 2005 are withdrawn.

Claim Objections

Claims 1, 10 and 13 are objected to for not containing a definition of "anisotropic shape". As is well known in the art, shape anisotropy is a property of any ferromagnetic material, the shape affecting the magnetization of the material differently in different directions (See van Dover et al. article, Magnetic Materials, pages 3-4). However, neither the claims nor the specification provide what is the "anisotropic shape" of the ferromagnetic runner as recited in the claim. Appropriate correction is thus required. Since any ferromagnetic material has shape anisotropy, the claims will be interpreted to mean that any ferromagnetic material, such as the recited runner, has an anisotropic shape.

Claim 4 is objected to because of the following informalities:

"said interfacing circuit" in lacks antecedent basis;

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2, 5-7, 9, 13, 14 and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Ramsden (Sensor Applications for Magnetic Materials). Regarding claims 1, 6, 13 and 18, Ramsden discloses a magnetic sensor comprising a ferromagnetic runner having an anisotropic shape and locatable relative to a target (See Ramsden page 4, FIG. 8, note ferrous core and the magnetic field applied to sensor would be provided by a target), and

a coil structure wound about the ferromagnetic runner (See same figure of Ramsden), such that when a magnetic field changes direction along an axial length of the runner, voltage is induces in the coil proportional to a time change of the magnetic flux thereof. This is a based upon Faraday's Law which states that

Emf = V = -[{change in flux}/{change in time}],

when the area to which the magnetic field is applied is constant:

V = -Area * [{magnetic field change}/{change in time}]

and for an inductor with N number of turns, this equation becomes

V = -N * Area * [{magnetic field change}/{change in time}].

Regarding claims 2 and 14, Ramsden discloses the coil structure wound tightly about the ferromagnetic runner such that the structure possesses a number of turns (See Ramsden FIG. 8). The remaining recitations of the claims are properties relating to the number of turns of any inductor having the recited structure. Since Ramsden's device discloses the structure, it has the properties.

Regarding claims 5, 7 and 17, Ramsden discloses that the soft magnetic material in the inductor of FIG. 8 is a permalloy, which has the property of being magneto-resistive material (See Ramsden page 3 and present specification on page 2, paragraph 006).

Regarding claims 9 and 19, because Ramsden discloses the structures of claims 1 and 13 as noted above, it has the properties outlined in claims 9 and 19 in view of the recitation of Faraday's Law noted above.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 3, 4, 8, 10-12, 15, 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramsden in view of Dezuari et al. (Development of a Novel Printed Circuit Board Technology of Inductive Device Applications). Regarding claims 3, 4, 8, 15, 16 and 20, Ramsden teaches all the features of claims 1 and 13 as discussed above. However, Ramsden does not explicitly disclose a manufacturing method of the coil design. Dezuari et al. teaches methods for interconnecting metals or semiconductor layers located beneath the runner and insulating metal both of which are used to create an interface circuit which integrates the runner and the coil (See Dezuari et al. page 2, 2.2 Fabrication process and note figures). It would have been obvious to a person having ordinary skill in the art to apply the fabrication process disclosed in Dezuari et al. to the sensor disclosed in Ramsden. One having ordinary skill in the art would have been motivated to do so to increase the miniaturization of such inductive devices (See Dezuari et al. page 1, note Introduction).

Regarding claims 10 and 11, Ramsden teaches a magnetic sensor comprising a ferromagnetic runner having an anisotropic shape and located relative to a target (See Ramsden page 4, FIG. 8, note ferrous core and the magnetic field applied to the sensor would be provided by a target), and a coil structure wound about the ferromagnetic runner (See same figure of Ramsden), such that when a magnetic field changes direction along an axial length of the runner, voltage is induces in the coil proportional to a time change of the magnetic flux thereof. This is a based upon Faraday's Law which states that

Emf = V = -[{change in flux}/{change in time}],

when the area to which the magnetic field is applied is constant:

V = -Area * [{magnetic field change}/{change in time}]

and for an inductor with N number of turns, this equation becomes

V = -N * Area * [{magnetic field change}/{change in time}].

Ramsden further teaches the coil structure wound tightly about the ferromagnetic runner such that the structure possesses a number of turns (See Ramsden FIG. 8), which has the property wherein it achieves a voltage spike amplitude when a magnetic field changes direction along the axial length of the runner.

However, Ramsden does not explicitly disclose a manufacturing method of the coil design. Dezuari et al. teaches methods for interconnecting metals or semiconductor layers located beneath the runner and insulating metal both of which are used to create an interface circuit which integrates the runner and the coil (See Dezuari et al. page 2, 2.2 Fabrication process and note figures). It would have been obvious to a person having ordinary skill in the art to apply the fabrication process disclosed in Dezuari et al. to the sensor disclosed in Ramsden. One having ordinary skill in the art would have been motivated to do so to increase the miniaturization of such inductive devices (See Dezuari et al. page 1, note Introduction).

Regarding claim 12, because Ramsden disclose the structures of claim 10 as noted above, it has the same properties in view of the recitation of Farraday's Law noted above.

Response to Arguments

Applicant's arguments filed May 18, 2005 have been fully considered but they are not persuasive.

Applicants' primary assertion for patentability is that the prior art references do not teach the ferromagnetic runner having an anisotropic shape. As is well known in the art,

anisotropy is the ability for a material to have different measurements when it is measured in different directions. Ferromagnetic materials further have properties based on their shape that affects their ability to be readily magnetized, known as magnetic shape anisotropy (See van Dover et al. article, Magnetic Materials, page 4). Thus, all ferromagnetic materials have shape anisotropy and their shape will affect the directional anisotropy. Since Ramsden and Ramsden in view of Dezauri et al. teach of ferromagnetic materials, these magnetic materials have such anisotropic shapes.

Applicants also assert that Ramsden fails to teach an interfacing circuit as recited in claim 13. It is initially noted that claim 13 recite "interfacing said ferromagnetic runner and said coil structure to thereby produce a magnetic field structure for magnetically sensing a target." Such language is also present in the present specification at page 7, lines 24-27 and illustrated in FIG. 3. As is understood from this clear language and shown in FIG. 3, the interfacing circuit is a core wrapped with a coil to form a magnetic sensor. This is precisely what not Ramsden discloses; and accordingly, Ramsden teaches this feature.

Finally, Applicants assert that because Dezauri et al. teaches manufacturing transformers and active fluxgate sensors,

it cannot be use to provide a teaching for the present invention. However, Applicants are attempting to attack this reference individually when it is the combination of references being used for the rejection. Dezauri et al. is not being applied in the rejection to teach the simple recited magnetometer, which is explicitly taught by Ramsden. Rather Dezauri et al. is being used to illustrate a method of making miniature inductive devices, which comprise coil and core arrangements using printed circuit board or semiconductor techniques. Since Ramsden teaches an inductive device comprising a coil and core arrangement, the technique of Dezauri et al. is directly applicable. Thus, one having ordinary skill in the art operating with routine skill in the art to make smaller a known device would look to Dezauri et al. in order to make the inductor device having a coil and core structure as taught by Ramsden miniature in size.

Conclusion

Applicant's amendment necessitated the amended grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J. Whittington whose telephone number is (571) 272-2264. The examiner can normally be reached on Monday-Friday, 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kenneth J Whittington
Examiner
Art Unit 2862

kjw